



**US Army Corps
of Engineers®**

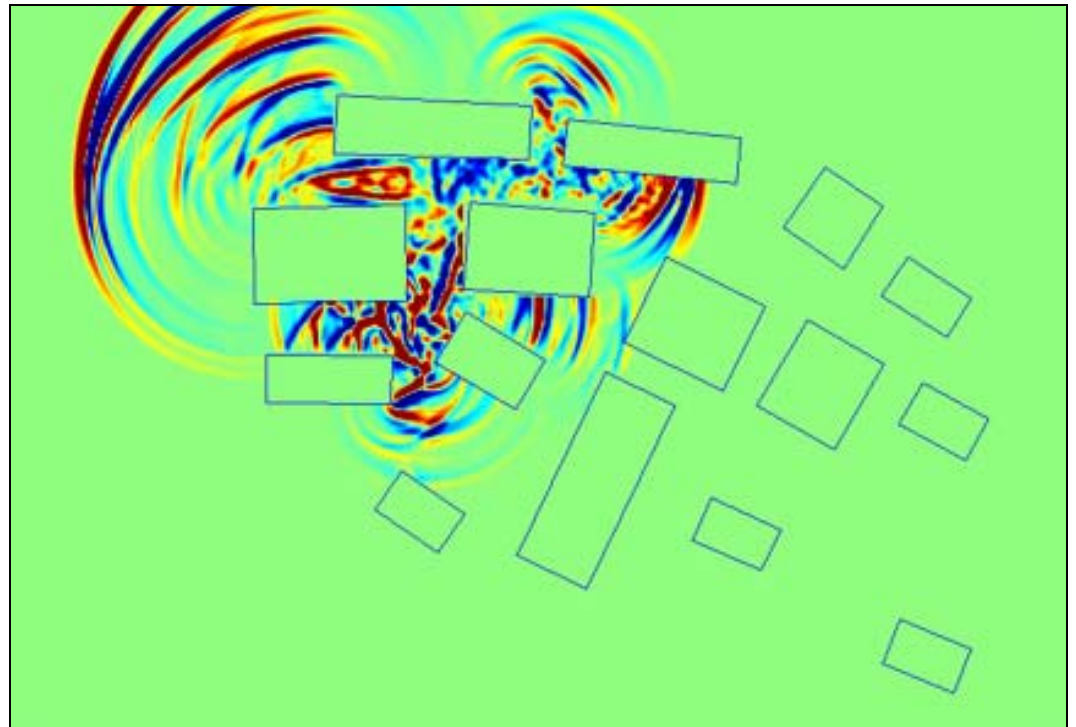
Engineer Research and
Development Center

Ongoing Research

Seismic and Acoustic Energy Propagation

Problem

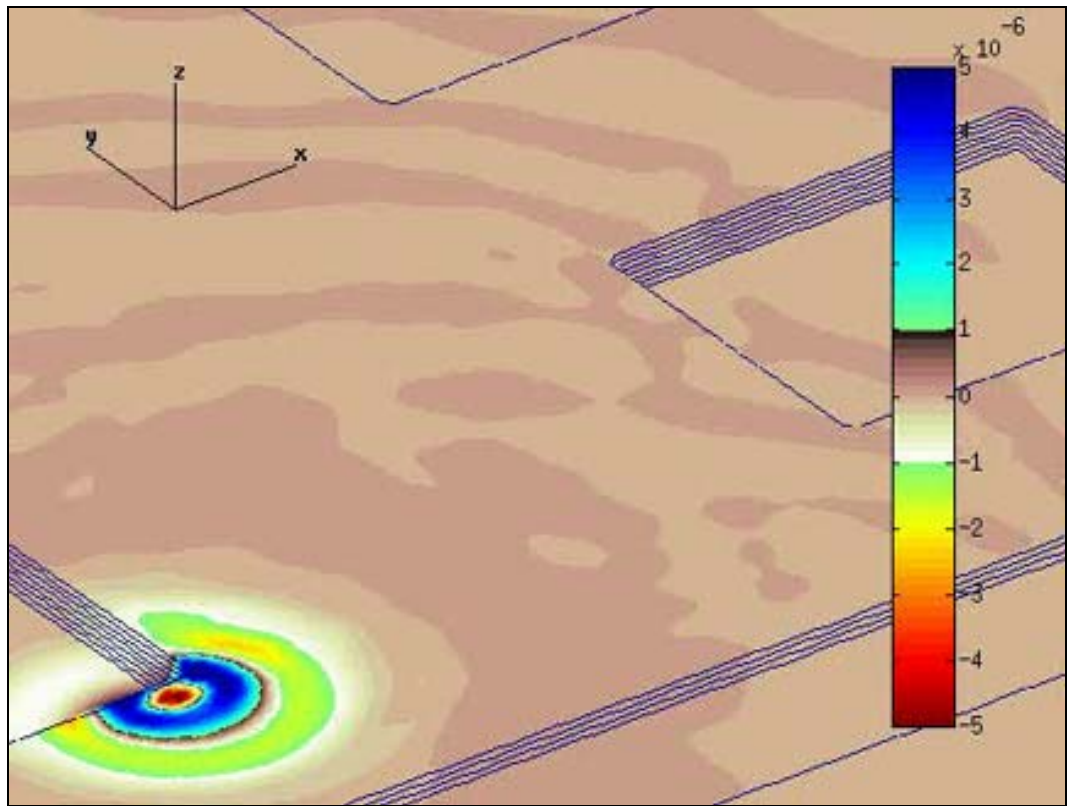
Military line-of-sight (LOS) sensors have large gaps in their surveillance coverage due to vegetation, urban structures, and geographic shadowing. The battlespace is a complicated environment in which to operate seismic and acoustic sensors because seismic propagation is complicated by geologic heterogeneity and acoustic sensor performance is limited by wind and competing noise. Complex geology and meteorology cause large fluctuations in the character of seismic and acoustic signals, which, if not adapted to the environment, will consequently lead to highly variable sensor performance. Because seismic-acoustic sensing has not been fully exploited at battlefield and urban scales, it is not known to what extent non-line-of-sight (NLOS) seismic and acoustic sensors can cover LOS gaps. Predictive modeling has been limited due to computational intensity.



Urban acoustic propagation simulation.

Description

This research is intended to develop methods to improve NLOS sensing, focusing on seismic and acoustic propagation. It is expected to resolve problems related to battlefield situational awareness, vehicle detection and tracking, sympathetic detonation of explosive charges, and control of sound on military training lands. Advanced sensing technologies are a key to transforming the United States Army into a more agile force capable of meeting modern threats. Research in this field is ongoing and is a major focus of the Geospatial Research and Engineering Business area.



Computational program of human footsteps in urban terrain.

Expected Products

This research is expected to produce three-dimensional seismic propagation models; acoustic models for wind, terrain, and urban effects; models of explosive noises and vehicle/human signatures and high-fidelity target signature models; target detection and discrimination methodologies; sensor algorithms for target tracking and classification; sensor performance prediction tools; and seismic models for forces modeling and simulation.

Potential Users

This research is intended for use by the Department of Defense.

Projected Benefits

Advanced sensing technologies are a key to providing information superiority on the modern battlefield.

Program Manager

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